



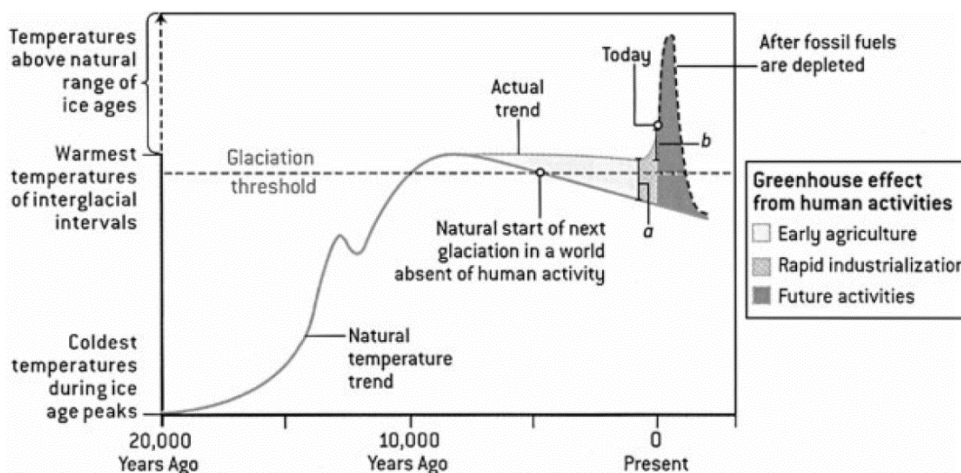
Part-B OPEN BOOK

Important Instructions

- There are FIVE questions printed in the question paper
- Answer all questions in the provided answer booklet only
- DO NOT use pencils for answering any part
- Start answering each question from a fresh page, all sub-sections together

Q.1.(a) Interpret the adjacent curve.

[3M]



(b) What is LCA? How is LCA conducted?

[1+3=4M]

(c) (i) What do you understand by the term 'nanomaterials' (ii) Mention the strategies for stabilization of nanomaterials (iii) Describe the different types of pyrolysis reactions?

[1+2+5=8M]

Q.2.(a) Describe the dry high temperature process of syngas cleaning after gasification

[3M]

(b) Describe in brief the terms HDO and DCO?

[4M]

(c) (i) How do the emulsifiers function? (ii) How are FAS formed?

[4M]

(d) (i) What is the compound dioctyl carbonate used for? Describe its synthesis and functions. (ii) Describe the synthesis of green diesel.

[4M]

Q.3.(a) Describe the sustainable process route to vanillin from glucose as starting material mentioning details of each step.

[4M]

(b) Catalytic alkoxylation of limonene using light alcohols yields chiral alkoxy products. Describe the reaction mentioning the origin of chirality

[4M]

(c)(i) Present logical remarks on the status of use of renewables in fine chemicals and pharmaceuticals sectors.

(ii) Write briefly about the product diversity starting from the opium alkaloid morphine.

[4+3=7M]

Q.4. (a)(i) What is the food security concern for the bioethanol production via biorefinery? **(ii)** Discuss in brief about the possibility of using non-food lignocellulosic biomass as second generation renewable feedstock for production of bioethanol. **[2+4=6M]**

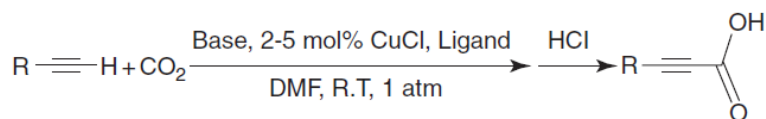
(b) (i) Discuss the current challenges and future directions for DEFC. **(ii)** What are the hurdles present in the area of ethanol conversion to gasoline? **[4+3=7M]**

(c) State the assumptions for the kinetic modeling of etherification of glycerol **[2M]**

Q.5 (a) (i) In the etherification of glycerol with isobutene, how can the selectivity to the terbutylated glycerol be enhanced? **(ii)** Analyse the possibility of a direct glycerol fuel cell **[2+4=6M]**

(b) Write a brief note about hydrogenolysis of glycerol **[5M]**

(c) (i) Cite the visualized advantages for Sorption Enhanced Reforming (SER) and Sorption Enhanced WGS (SEWGS) **(ii)** Identify this reaction and mention the salient features of it. **[2+2=4M]**



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